Thrips From Kauai[1] [2]

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Forty lots of thrips specimens were collected during the period from August 12 to September 15, 1943 by one of the authors (T.N.), at various localities along the drier section of the lowlands from Wailua to Kekaha and in the wet highlands of Kokee. The specimens were examined by the other author (K.S.). Collections were most concentrated at Hanapepe where almost one-half of the material was collected. The cultivated plants and nearby weeds were mainly examined, particularly to search for the presence of *Hercothrips fasciatus* (Perg.) which was recently discovered on the island of Molokai (13) and to ascertain the distribution and population status of *Frankliniella* sp., another recent immigrant species. There was no indication of the presence of the former species there, but the latter was widely distributed and very abundant. Very little of the thysanopterous fauna, especially of the introduced species in the cultivated lowlands of this island has been known; only seven species had been recorded up to 1937 when one of the authors (K.S.) (11) made the first extensive collection and added 13 species to its list. The present collection added seven more heretofore unrecorded species. A complete list of species now known from this island is given at the end of the paper.

Heliothrips haemorrhoidalis Bouché

Kapaa: Hibiscus, flowers.[3]

Kokee: Gladiolus, leaves.

A light infestation of this thrips along with an even lighter one of *Taeniothrips simplex* was found on a few gladiolus plants growing under semi-wild conditions within the forest area. A single specimen was also collected from hibiscus. This species is apparently a forest or wetland species. Gladiolus is a new local host

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[3] Collected by Mr. K. Ito in June, 1943.

record. These are the second collections on Kauai; the first specimen was collected in 1895 by Dr. R. C. L. Perkins (1).

Selenothrips rubrocinctus (Giard)

Hanapepe: *Eugenia cumini* (Java plum), leaves.
Litchi chinensis (litchi), leaves.

Severe injuries were observed on a young Java plum where the populations were extremely high. Infestation was very low on a litchi growing in the vicinity. Litchi is a new local host record.

Chirothrips fulvus Moulton

Hanapepe: *Paspalum dilatatum* (dallis grass), flower sheaths.

A few specimens were collected from within the half-open flower sheaths. This is the first collection from Kauai and the host is a new record. Only three collections have been made, all from Oahu, in the past; from *Paspalum orbiculare* in 1930 (8), on wind traps in 1935 (4), and from the same host again in 1938 (12). Although the species was described from specimens collected from the Hawaiian Islands, it probably has been introduced from the mainland for its presence was recently reported from Texas (6).

Chirothrips spiniceps Hood

Hanapepe: *Echinochloa crusgalli* (barnyard grass), flower sheaths.

A light infestation was found within the half-open flower sheaths of the plants growing in a rice patch. This is the second collection on Kauai and the host is a new record. The Hawaiian species was described under the name of *C. sacchari* Moulton from specimens collected on Oahu in 1929 (8), but was subsequently recorded as a synonym of *C. spiniceps* (5) (6), often abundant and widely distributed in southern United States as well as along the Atlantic coast and once observed as having been abundant on sugar cane in Arizona. This species must have been introduced from the mainland.

Scirtothrips antennatus Moulton

Upper Kekaha: Carrot, leaves.

A single specimen was collected. This species has been known in the Hawaiian Islands since 1930 (9), and is distributed on Oahu also. Panax is the preferred host, but there are two other known host plants. The present one is a new record.

Leucothrips piercei (Morgan)

Wailua: Bush bean, leaves.
Waimea: Bush bean, leaves of seedlings.
Upper Kekaha: Carrot, leaves.

Light infestations of this species, a common thrips on various vegetables and ornamental herbs, were found at each of the localities, making this the second collection from Kauai. This species has been known in the Hawaiian Islands since 1931 when the first specimen was collected from cocklebur (*Xanthium saccharatum*) at Moanalua, Oahu. Although Mr. Dudley Moulton determined the species from the specimen mentioned above, he failed to list it in his papers of Hawaiian thrips. The known distribution is only Oahu and Kauai.

Dendrothripoides ipomeae Bag.

Lihue: Sweet potato, leaves.

A light infestation causing slight injuries was observed in a large planting of sweet potato. This is the first record from Kauai. This species was only quite recently, in 1940, discovered in the Hawaiian Islands, at Kailua, Oahu (2). Although an infestation on sweet potato was first found at Ewa, Oahu in 1941, it was stated that there were no visible injuries (3). However, one of the authors (T.N.) observed severe injuries as scars and malformation at the growing terminals on sweet potato at the University farm in Manoa, Oahu in May, 1942, and moderate injuries on lettuce growing nearby. The determination of the species was made by Dr. J. D. Hood. In addition to the above records, the other author (K.S.) found a moderate infestation on yam (*Dioscorea* sp.) at Waialae, Oahu in September, 1943, and collected a single specimen from koali (*Ipomoea congesta*) at Kahaluu, Oahu in October, 1942. These records indicate that this species must be rather common and generally distributed, at least on Oahu.

Anaphothrips (Chaetanaphothrips) orchidii (Moulton)

Hanapepe: *Litchi chinensis* (litchi), leaves.

A single specimen was collected. This is the first collection from Kauai and the host is a new record. This species has been known in the Hawaiian Islands since 1926 (7) but reported only from Oahu. This is a rather common thrips and has a fairly wide host range; bougainvillea flowers were recently found moderately infested at Hauula and Manoa, Oahu, and breeding was also observed on leaves of *Emilia sonchifolia* under confinement.

Scolothrips sexmaculatus (Perg.)

Waimea: Bush bean, leaves of seedlings.

Thunbergia grandiflora (thunbergia), leaves.

A few specimens were collected on both plants on which moderate infestations of mites were found. The present collection is

the first record from Kauai. This species has been known in the Hawaiian Islands since about 1910 (1) but reported only from Oahu. Although collections have been recorded only twice in the past, a long series of unpublished data indicates that this is one of the common thrips on Oahu and that wherever plants, especially cultivated plants, are infested with mites, the thrips populations are gradually built up. Such an association of this thrips with mite was found not only in the dryland but also in wetland areas.

Frankliniella sp.

Kapaia: Eggplant, flowers.
Lihue: *Melaleuca leucadendron* (paper bark), flowers.
Upper Wahiawa: *Aster* sp., flowers.
Hanapepe: Hibiscus, flowers.
Momordica balsamina (balsam apple), flowers.
Salvia leucantha (a sage), flowers.
Crotalaria mucronata (*C. saltiana* of the Hawaiian authors) (rattle pod), flowers.
Amaranthus hybridus (spleen amaranth), flowers.
Sesbania grandiflora (sesban), flowers.
Canna, flowers.
Abutilon molle (wild abutilon), flowers.
Erigeron albidus (horseweed), flowers.
Ipomoea congesta (*I. insularis* of the Hawaiian authors) (koali), flowers.
Makaweli: Hibiscus, flowers.[4]
Waimea: Pole bean, flowers.
Eggplant, flowers.
Waimea beach: *Ipomoea pes-caprae* (beach morning glory), flowers.
Tribulus cistoides (nohu), flowers.
Kekaha: *Leucaena glauca* (koa haole), flowers.
Prosopis chilensis (kiawe), flowers.
Kokee: *Buddleia japonica* (summer lilac), flowers.

This is the same species mentioned in the previous papers (10) (13). In a discussion with Mr. N. L. H. Krauss, he remarked that some specimens which he thought were this species were among his Kauai thrips collection of October, 1942. This is presumed to be the first record of this thrips from Kauai. The present collection showed that this species is as widely distributed and as common and abundant there as it is on Oahu. The largest number of specimens of a single species in the whole collection was of this thrips which indicates that this is the commonest thrips in the lowland

[4] Collected by Mr. K. I. Hanson in September, 1943.

during the dry season. As no specimen was collected in 1937 (11), the establishment on Kauai must have been made since this date.

Through the effort of Dr. F. G. Holdaway, specimens of this species from Hawaii were recently made available for examination. They were collected from eggplant flowers at Kona in September, 1943. Now, the known distribution includes all islands of the Hawaiian group except Lanai.

Infestations were heavy on balsam apple, rattle pod, koali, hibiscus at Makaweli, pole bean, eggplant at Waimea, and beach morning glory; moderate on eggplant at Kapaia, sesban, canna, wild abutilon, nohu, and koa haole; and light on the others. However, the species was predominant on every host plant examined except paper bark, *Aster* sp., amaranth, canna, horseweed, koa haole, and summer lilac. Populations were generally high in the drier sections between Hanapepe and Kekaha, and low in the slightly wetter sections north of Lihue and at Kokee. The predominating thrips on flowers in the drier areas was the present species; but in the wetter areas, *Thrips hawaiiensis* and *T. hawaiiensis* f. *imitator*. These indications for a differential preferred habitat of these two thrips were also observed on Oahu, Maui, and Molokai (13). All host plants except eggplant, hibiscus, and nohu are new host records.

Taeniothrips alliorum Pr.

Upper Kekaha: Onion, leaves.

Relatively high populations for this species were found at upper Kekaha. A wetland species, it seldom establishes high populations in the dry lowlands. This species has been known in the Hawaiian Islands since 1930 (8) and reported from all the islands except Hawaii. It probably has been introduced from the Orient, where it is especially common in Japan, Korea, Loochoo, and Formosa.

Taeniothrips simplex Morison

Kokee: Gladiolus, leaves.

Tritonia crocosmaeflora (montbretia), flowers.

Infestations were light on gladiolus but moderate on montbretia and few typical scars were found on both plants growing under semi-wild conditions within the forest area. Gladiolus was examined for this thrips at several places on the previous trip (11) but its presence could not be found at that time. Apparently this is the first record from Kauai. The known distribution now includes all of the Hawaiian Islands except Molokai and Lanai. This species is quite a specific feeder and only very few normal, natural host plants are known in the other countries where it occurs. Montbretia

is one of these few plants and collection from it, a new local host record, is very interesting.

Thrips hawaiiensis (Morgan) and **T. hawaiiensis** f. **imitator** Pr.

Kapaa: Hibiscus, flowers.[5]
Upper Wailua: Bell pepper, flowers.
Wailua: Bush bean, flowers and leaves.
Lihue: *Scaevola frutescens* var. *sericea* (beach naupaka), flowers.
Melaleuca leucadendron (paper bark), flowers.
Upper Wahiawa: *Aster* sp., flowers.
Hanapepe: Bush bean, flowers.
Crotalaria mucronata (rattle pod), flowers.
Canna, flowers.
Telosma cordata (pakalana), flowers.
Waimea: Pole bean, flowers.
Kekaha: *Leucaena glauca* (koa haole), flowers.
Kokee: *Buddleia japonica* (summer lilac), flowers.
Gladiolus, leaves.

These flower thrips were very common and abundant and collected from various hosts throughout the areas covered by the collection. Infestations were heavy on bell pepper, beach naupaka, pakalana, and summer lilac; moderate on hibiscus, bush bean at Wailua and Hanapepe, paper bark, canna, and koa haole; and light on the others. Although these species showed some preference for certain hosts, their populations were generally high in the wetter sections or under shady surroundings and were low in the drier sections between Hanapepe and Kekaha. Bell pepper, bush and pole bean, beach naupaka, paper bark, *Aster* sp., pakalana, summer lilac are new local host records. Among 152 specimens examined, there were 92 *imitator,* 55 *hawaiiensis,* and 5 others with anomalous antennae.

Thrips tabaci Lind.

Wailua: Bush bean, leaves.
Upper Wahiawa: *Aster* sp., flowers.
Waimea: Bush bean, leaves of seedlings.
Kekaha: *Leucaena glauca* (koa haole), flowers.
Upper Kekaha: Carrot, leaves.
Onion, leaves.

Infestations were either very light or light on bean and carrot on which *Leucothrips piercei* predominated. A moderate infesta-

[5] Collected by Mr. K. Ito in June, 1943.

tion along with a subincidental number of *Taeniothrips alliorum* was found on onion at upper Kekaha. Very few were collected from *Aster* sp., a new local host record, and koa haole.

Thrips (Isoneurothrips) australis (Bag.)

Kokee: *Buddleia japonica* (summer lilac), flowers.

A single specimen was collected in the rain forest area. This is the first record from Kauai. As in Australia, the native territory of this species, there seem to be many other host plants besides *Eucalyptus,* a preferred host, in the Hawaiian Islands. Summer lilac is a new local host record.

Plesiothrips panicus (Moulton)

Hanapepe: *Paspalum dilatatum* (dallis grass), flower sheaths.

A single specimen was collected from within half-open flower sheaths. This is the second collection on Kauai and the host is a new record. The earliest collection of this species, one of the very common grass thrips, in the Hawaiian Islands was made in 1928 (8) and its known distribution also includes Oahu and Molokai. This species is probably a synonym of *P. perplexus* (Beach) (13).

Haplothrips gowdeyi (Frank.)

Upper Wahiawa: *Aster* sp., flowers.
Hanapepe: *Salvia leucantha* (a sage), flowers.
Crotalaria mucronata (rattle pod), flowers.
Amaranthus hybridus (spleen amaranth), flowers.
Mimosa pudica (sensitive plant), flowers.
Carrot, flowers.
Canna, flowers.
Erigeron albidus (horseweed), flowers.
Echinochloa crusgalli (barnyard grass), flower sheaths.
Paspalum dilatatum (dallis grass), flower sheaths.
Waimea beach: *Tribulus cistoides* (nohu), flowers.
Upper Kekaha: Carrot, leaves.
Kokee: *Buddleia japonica* (summer lilac), flowers.

This common and very polyphagous thrips was frequently collected from cultivated plants and weeds throughout the area covered by the present collection. Infestations were heavy only on amaranth which seems to be a preferred host; moderate on *Aster* sp., horseweed, and nohu; and light on the others. *Aster* sp., *Salvia leucantha,* spleen amaranth, sensitive plant, canna, barnyard grass, dallis grass, nohu, and summer lilac are new local host records.

LIST OF THRIPS KNOWN FROM KAUAI

Terebrantia

Heliothrips haemorrhoidalis Bouché
Selenothrips rubrocinctus (Giard)
*Chirothrips fulvus Moulton
Chirothrips spiniceps Hood
Limothrips cerealium Halid.
Scirtothrips antennatus Moulton
Leucothrips piercei (Morgan)
*Dendrothripoides ipomeae Bag.
Anaphothrips swezeyi Moulton
*Anaphothrips (Chaetanaphothrips) orchidii (Moulton)
*Scolothrips sexmaculatus (Perg.)
*Frankliniella sp.
Taeniothrips alliorum Pr.
*Taeniothrips simplex Morison
Thrips hawaiiensis (Morgan)
Thrips hawaiiensis f. imitator Pr.
Thrips saccharoni Moulton
Thrips tabaci Lind.
*Thrips (Isoneurothrips) australis (Bag.)
Thrips (Isoneurothrips) multispinus Bag.
Thrips (Isoneurothrips) spp. (3 species)[6]
Thrips (Microcephalothrips) abdominalis Cwfd.
Plesiothrips panicus (Moulton)

Tubulifera

Dermothrips hawaiiensis Bag.
Karnyothrips melaleuca (Bag.)
Haplothrips gowdeyi (Frank.)

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* Heretofore unrecorded species on Kauai.
[6] Refer to the previous paper (11).

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